PHY 375S: INTRODUCTORY SOLID-STATE PHYSICS
FALL 2014, UNIQUE # 58245
TTH 11 AM -12:15 PM, RLM 5.116
http://canvas.utexas.edu

Instructor: Zhen Yao**,** yao@physics.utexas.edu, 512-471-1058, RLM 13.208
Office Hours: Tuesdays and Thursdays 1-2 pm. Other times by appointment.

Text: Charles Kittel, *Introduction to Solid State Physics*, 8th Edition, Wiley (2005)

References:

- J. R. Hook and H. E. Hall, *Solid State Physics*, 2nd Edition, Wiley (1995)
- H. Ibach and H. Lüth, *Solid-State Physics*: *An Introduction to Principles of Materials Science,*, 4th Edition, Springer (2009)
- N. W. Ashcroft and N. D. Mermin, *Solid State Physics*, Saunders (1976)

Overview: The purpose of this course is to present a survey of fundamental concepts, physical principles, and experimental techniques in the study of crystalline solid-state materials. Topics include description of crystal structures, lattice vibrations/phonons, thermal properties of solids, quantum-mechanical description of electrons in crystals, electronic properties and transport in metals and semiconductors. Special phenomena including magnetism and superconductivity will also be discussed.

Prerequisites: Undergraduate statistical mechanics and quantum mechanics (PHY 369 and 373 or equivalent).

Administrative Issues: Please see Lisa Gentry, Undergraduate Office, RLM 5.216, 512-471-8856

Grading: Course grades will be determined as follows:

Homework	30%
Midterm exams	40%
Final exam	30%

There will be a total of approximately 10 homework assignments. The assignments will be posted on Canvas and due in class. No late homework will be accepted after the solutions have been posted. There will be two midterm exams on Tuesdays October 14 and November 20. The final exam is comprehensive and mandatory and will be held from 9 am to noon on Saturday, December 13. Grade cutoffs will be determined at the end of the semester.

Important Dates:

- Last day to drop a course for a possible refund is Friday September 12.
- Last day a graduate student may change registration in a class to or from the credit/no credit basis is Wednesday October 22.

- Last day an undergraduate student may drop a class with approval or change registration in a class to or from the pass/fail basis is Tuesday November 4.
- Last day a graduate student may drop a class with approval is Friday December 5.

Special Accommodations: The University of Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-6441 TTY.

Tentative Course Schedule (following Kittel):

	Day	Date	TOPICS	Chapters
1	TH	08/28	Introduction	
2	T	09/02	Crystal structure	1
3	TH	09/04	Crystal structure continued	1
4	T	09/09	Diffraction and reciprocal lattice	2
5	TH	09/11	Diffraction and reciprocal lattice continued	2
6	T	09/16	Crystal binding	3
7	TH	09/18	Crystal binding continued	3
8	T	09/23	Crystal vibrations	4
9	TH	09/25	Crystal vibrations continued	4
10	T	09/30	Thermal properties	5
11	TH	10/02	Thermal properties continued	5
12	T	10/07	Free electron gas	6
13	TH	10/09	Free electron gas continued	6
	T	10/14	**Midterm #1 (Ch. 1-5)**	
14	TH	10/16	Energy bands	7
15	T	10/21	Energy bands continued	7
16	TH	10/23	Energy bands continued	9
17	T	10/28	Energy bands continued	9
18	TH	10/30	Semiconductors	8
19	T	11/04	Semiconductors continued	8
20	TH	11/06	Semiconductor Devices	17
21	T	11/11	Magnetism	11
22	TH	11/13	Magnetism	12
	T	11/18	**Midterm #2 (Ch. 6-9)**	
23	TH	11/20	Magnetism	12
24	T	11/25	Superconductivity	10
	TH	11/27	Thanksgiving	
25	T	12/02	Superconductivity	10
26	TH	12/04	Review	